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BRIEFLY TOLD.

HOW TO MANAGE THE BUSINESS OF GAS COMPANIES.—Elsewhere in this issue we print a paper entitled "How to Conserve and Extend the Commerce of Gas Companies," that was read by Mr. A. B. Slater, of Providence, at the last meeting of the Society of Gas Lighting. It seems hardly necessary to say at the outset that Mr. Slater is peculiarly well qualified, both by nature and practice, to discuss this theme; for in the first place he is endowed plentifully with those qualities of mind and manner that go to make up the well-balanced man, and in the second place his business lot in life has been cast in a community that seldom takes anything for granted. Wanting proof of that which is put to them as a "good thing," if the proof submitted answers satisfactorily to the test which they apply to it, the "good thing" is freely availed of. Under such conditions, then, the success of Mr. Slater as the manager of a prosperous gas company gives rise to no speculation regarding his advancement and its betterment. Accordingly it is likely to be admitted that his views on how to increase the business of gas companies are worthy of study, and not only of study, but of application.

We know that this is an old theme, and one that has been discussed with that frequency which attaches to aged subjects, but which ever continue with us as young issues. No matter how frequently they are dissected, the latest surgeon to insert the knife is safe to lay bare some new muscle that, given its appropriate attention, may cause better development in the general structure. And so it is, we think, with the exemplification just given by Mr. Slater, who, while he proposes nothing particularly novel or startling, nevertheless advances points that if properly followed cannot but lead to pleasing results.

GAS MANUFACTURERS MAY JOIN IN THE THANKSGIVING.—As this is the official season for thanksgiving, it may not be out-of-place for the fraternity to look over the situation as it is, in the attempt to perceive wherein they have been benefited during the twelvemonth. Comparisons may be odious—and gaseous comparisons are likely to be so considered, by the consumer at least—but a good deal depends on the verdict that results from the juxtaposition. A twelvemonth ago it seemed as if the electricians could not find a volume of voice sufficiently loud wherefore to convey to the world in general and to the gas maker in particular that the day of the latter as a purveyor of artificial light had about seen its twenty-fourth hour. True it is that the electricians kindly pointed out a shallow water harbor in which the gas man's anchor might come to rest and thus keep him from complete wreck on the commercial coast; and the shallow water harbor was nothing less than the haven afforded by the distribution of an artificial fuel gas. However, what has been the teaching and what is the result of the twelvemonth's experience? Shortly stated, the outcome is about like this. The increase in the output of illuminating gas has been most marked, and the latter feature became all the more pronounced with the ageing of the year. It is not difficult, either, to account for this satisfactory state of affairs. The renewals, repairs and extensions to plants that were made two or three years ago (and it must be confessed that the competition of electric lighting had much to do with the carrying out of these betterment schemes) are now bearing fruit, and the growth

and ripening of the latter have been fostered by lower prices and more satisfactory services. It has been urged that new construction—that is, the erection of plants in towns that a few years ago would have been ripe for gas supply—made but slow progress in the year, and that is seemingly so. But we are in position to say that all this will be changed in 1890, for we know now of at least 12 points in the country where new gas works are to be erected in the coming year, and each one of these points at present holds an electric light plant. Further, at three of these points it is those who are interested in the electric lighting supply that will undertake the supply of gas. Hence we are confident that the introduction of gas supply in places where former conditions of population, wealth, etc., seemed sufficient to warrant the installation and operation of gas works, is hereafter to be governed by the rule of availability that operated say three years ago. Nor has the gas manufacturer failed to take advantage of that shallow water harbor—the supply of an artificial fuel gas; although the conditions under which his anchor was cast therein differed somewhat from those proposed by the electricians. Fuel gas is an actual fact, but it is illuminating fuel gas that is being distributed, and that is likely to be distributed with the greatest degree of success in the future. In fact so pronounced has been the success that has attended the efforts of some companies to (by ordinary and sustained common-sense business methods) introduce the use of gas for purposes other than illumination, that 30 per cent. of their total output is now chargeable to such supply. In fact a calm review of the situation leads to the comfortable reflection that the gas maker can join with those in other lines of commerce in thanksgiving over the measure of success which attended his efforts in the past year. Further, that his thankfulness can be intensified in the reflection that the months to come promise even greater success than that recorded of those which contributed their share to the history of the current year.

An Injunction Refused.—The Supreme Court has rendered a decision in the case of the suit brought against the city authorities of Hamilton, Ohio, by the proprietors of the old Hamilton Gas Light and Coke Company, under which the latter asked for an injunction to restrain the authorities from completing the construction of the Municipal gas plant now underway there. The Court refused the injunction on the ground that if the city had the right to build the plant it would be wrong to stop the work; and if it did not have the power the work was being done at the city's risk. As the right of the city to prosecute the task could not be considered under the injunction proceedings, the remedy for any injury sustained by complainant must be determined by another form of legal procedure.

The authorities of North Adams Mass., have finally awarded a contract for the public lighting of what is known as the "Fire District" by electricity. The successful bidder was the North Adams Electric Light and Power Company, but as this is virtually owned by the North Adams Gas Company, Treasurer Richardson, of the latter corporation, is quite resigned to the change.

Some time ago we noted that the Citizens Gas Light and Heating Company of Bloomington, Ills., was considering the advisability of engaging in the supply of electricity. The matter having been decided in the affirmative, the Westinghouse Company has been awarded a contract to install the necessary plant. Both arc and incandescent lights are to be supplied.

What Mr. Dell Thinks about it.—Mr. John Dell, of St. Louis, is about as well known to the Western fraternity as any other man in that section of the country, and he usually keeps his eyes open. A few days ago he was "interviewed" by a reporter of the St. Louis *Globe-Democrat* as to his opinion on the standing enjoyed by gas in the race for public favor as an illuminant. In reply to the news man Mr. Dell said: "I am frequently asked by people throughout the country whether business is not dull in my line—the manufacture of retorts for coal gas works. When I ask why it should be they reply: The general introduction of electricity. When I tell them that since the general introduction of electricity for illuminating purposes in the cities, the consumption of gas has doubled, trebled and quadrupled in many instances they are incredulous. The fact is, however, that gas companies thrive by the electrical opposition. One storekeeper introduces electricity. His neighbor is forced to double the number of his gas burners in order not to be left in the dark. This he can do at less expense than he can put in electricity. As gas cheapens its use as fuel will increase. Kerosene suffers in this fight, alone. Holders of gas stock do not seem to be alarmed by the opposition of electricity, if recent prices obtained for it in this city are an indication."

Encouraging Gas Consumption in France.—Some months ago the *Gas World* gave an account of what M. Melon had been doing at Lille, France, in the way of supplying fittings, gratuitously set up and remaining the property of the Company for three years, with a view to the encouragement of gas consumption, and stated that the effort had been attended with good success. In supplementing that account in a more recent number, the *Gas World* says: "Now M. Melon is again before us in the shape of a paper read to the Societe Technique, in which he narrates the results of a year's practical working. At 31st of April last the number of fittings gratuitously set up by the two Lille Companies was 443. Of these 119 were of 2 burners; 279 of 3; 11 of 4; 10 of 5; 5 of 6; 1 of 7; 3 of 8; 6 of 10; 3 of 15; 2 of 25, and 4 installations of 35 burners; in all 443 installations, with 1,525 burners. Besides these there were some 5 very large industrial installations; but here we have to do with the small ones. The consumers on these burners have entered into 3-years' contracts; between them they are to burn 8,079,000 cubic feet a year, or 5,300 cubic feet a year per burner. Some of the members of the Societe Technique thought last year that this was too high a figure; but it had been based on actual experience, and it has been realized. During the year the consumption of 92 consumers was ascertained; their contract was for 1,497,000 cubic feet; they used 1,730,000, or an average of 6,710 cubic feet per burner instead of 5,300. Some few consumers, especially among those who had 3 or 5 burners, which turned out to be more than they required, had used less than they agreed to, but the average was as above. M. Melon thinks that the class reached by this device is, burner for burner, the most remunerative of all classes of consumers. As to bad debts—out of the 443 consumers, two (6 burners) have become bankrupt, and two (6 burners) ran away; total loss, 1 per cent. The results have determined the Lille undertakings to push this mode of doing business. In Antwerp the system has been adopted, and the customers lost on account of the cheapness of petroleum have been almost all recovered, the aggregate consumption having increased 30 per cent. during the year."

It is with sincere regret that we announce the death (on the afternoon of Sunday, November 24th) of Mrs. Susan Ann Ramsdell, mother of Mr. George G. Ramsdell, of Vincennes, Ind.

The manufacturing apparatus at the new Pierre (S. Dak.) works is to consist of a double set (four foot) of Springer cupola.

Recent Patent Issues.

The following list of recent patents relating to the gas interests is specially reported by Franklin H. Hough, solicitor of American and foreign patents, 925 F street, N. W., Washington, D. C.

Issue of November 5, 1889.

414,549. Gas and Air Mixer. H. Klahre, Chicago, Ill.
414,180. Gas Burner. J. Baker, St. Louis, Mo.
414,470. Gas Generating Apparatus. W. S. Wright, Chicago, Ill.
414,525. Gas Governor. G. H. Gregory, Brooklyn, N. Y.
414,499. Gas Pressure Reducing Station for Streets. J. C. Conroy, Pittsburgh, Pa.
413,638. Gas Regulating Burner. G. H. Gregory, Brooklyn, N. Y.

Issue of November 12, 1889.

414,883. Gas Burner, Alarm Attachment for. E. L Harrison, Ashland, Wis.
414,691. Gas Generator, Carbonic Acid. J. A. Field and J. Siebrecht, York, N. Y.
414,763. Gas Lighting, Automatic Circuit and Breaking Mechanism for. W. W. Estabrooke, Boston, Mass.

Issue of November 19, 1889.

415,565. Gas, Apparatus for Manufacture of. J. M. Rose, Allegheny, Pa.
415,418. Gas Burner for Stoves and Fireplaces. T. McSweeney, Allegheny, Pa.
415,187. Gas Engine. H. J. Hartig, Brooklyn, N. Y.
415,570. Gas Fixture. H. Schrader, Philadelphia, Pa.
415,464. Gas, Manufacture of. J. M. Rose, Allegheny, Pa.
415,646. Gas Washer. V. Kusnezov, St. Petersburg, Russia.

Issue of November 26, 1889.

415,804. Gas Check. T. Angel, Brooklyn, N. Y.
416,047. Gas Generating Apparatus. R. Boeklen and W. S. Wright, Brooklyn, N. Y.
416,060, 416,061. Gas or Fluid for Steam Pressure, Apparatus for Regulating Flow of. G. C. Jackson, Dushore, Pa.

[A Paper read before the Society of Gas Lighting.]

How to Conserve and Extend the Commerce of Gas Companies.

By Mr. A. B. Slater.

Advancement, development and progress are terms which are applicable to the manner in which all business enterprises are now carried on, and an increasing ratio of change in these respects has been going on for many years. The rapid development of means of communication, not only within short distances, but extending more or less over the whole world, has made possible ways and means which have eagerly been taken advantage of by men of quick perception and judgment, so that others less enterprising and progressive find themselves compelled to follow in the same line or gradually see their trade lessening year by year.

It would perhaps be a waste of time to stop and inquire why such a condition of things exists. It is quite sufficient to know that such facts do exist. A general commanding an army may lay well developed plans for fighting a campaign or battle, but his plans are likely to be interfered with; and, when they are, if he has not the ability to take advantage of circumstances on the spot without delay, his success is quite uncertain. This faculty or ability was plainly distinguishable among the officers of the army of the late rebellion. Just so it is in business. The active business man of to-day, aided by all the facilities afforded him, coupled with quick judgment and progressive views, is he who does not always wait for things to turn up for him, but rather forestalls the action of the ordinary business man, and as far as possible makes circumstances bend to his will, and thus secures the successful termination of his plans. Oftentimes, instead of credit being given him for success which has been achieved through his good judgment and force of character, it is attributed to mere luck or to chance circumstances.

Unceasing activity must be the motto or governing spirit which actuates the man of business of the present day, if he expects to be and to continue in the front rank of those in a similar line of trade or business. The aged tradesman, who perhaps has spent years in his business, and who formerly had hundreds of customers, wonders why they have dropped off one by one until he may count them by scores only. If he stops to inquire the reason he finds that instead of the customers coming to him his competitors in the same line of business have gone to them while he has been waiting for them. Not only is this state of things true as regards the retail and wholesale trade, but nearly all commercial houses have their "drummers" or sale agents out securing trade, which otherwise they would not have.

Well, you say, what has all this to do with the gas business? Let us inquire into the facts as they exist and try to ascertain whether there is any relation between the conditions which affect ordinary trade and the conditions which obtain now in regard to our own business.

It is less than a decade when the gas manufacturer had business enough, as he thought. Increasing as it was year after year, with no effort on his part, he hardly thought of going outside of his own yard or office, except to lay mains and services and set meters—not that the business does not increase now; for it does rapidly with nearly all companies; but other conditions exist.

In all our large cities the electric light man is actively canvassing for customers. He does not care for small ones so much, but he endeavors to select the best ones. He is profuse and wordy in his efforts to illustrate the advantages of electric light; some of which it has and some it has not. The feature of novelty attracts many, but when the bills are presented it often disappears. The policy of endeavoring to hold the customer by a contract is a wise one for the electric light company, but very questionable for the customer; for if he becomes dissatisfied with the light or the cost when his bill is presented he finds himself bound to continue to use it whether he wants to or not.

After the question of novelty has been overcome, the really vital and practical one is presented, and that is the question of cost for a given quantity of light, not altogether leaving out the quality of the light. Much dissatisfaction with the size of bills has been expressed since the introduction of electric light meters. Previous to the introduction of the latter a stated price was made, and the customer had no incentive to be economical in the use of his burners.

The better class of regenerative burners, where the ceilings are high enough to admit of their use, will furnish a light more satisfactory in all respects than any electric light of equal cost. It is sometimes said they are objectionable on account of the heat. Except in the case of low ceilings, this is more imaginary than real. The heat is a positive benefit where there is proper ventilation, as there should be, because it causes a change of air; which is certainly preferable to no ventilation with the electric light, and the air is vitiated by being breathed over and over again, which is likely to be the case where no attention is given to ventilation for the reason that the electric light is said not to vitiate the air.

Taking all these things into consideration, why should not the gas company take the necessary means to give the consumer all needed information, advice, and assistance to obtain the best and most satisfactory light for his money, and in that way hold many consumers who might be induced, through the representatives of parties interested in other modes of lighting, to change; and, also, to secure as many new customers as possible by showing them in a practical way how to obtain the best light for the least money.

It is my opinion that a gas company should employ one or more men of good practical judgment, with the requisite information relating to lighting all places where light is required, so as to secure the best results, and he should give his whole time and attention to this part of the business, which is now almost wholly neglected. His advice and judgment could be given to piping buildings, locating the places where meters are to be set, and, generally, all matters connected with piping, kinds of burners to be used, arrangement of light, etc. Such interest and attention to the wants and needs of the consumer have not often been considered necessary heretofore; but as I have before said, it is found to be imperatively so in most other kinds of business, and in my judgment the time has arrived when it is equally so in the business of the gas company.

A large number of the burners in ordinary use are cheap and wholly unfitted to give that good or satisfactory light which the gas is capable of giving if consumed in a good burner. The average consumer knows little, and apparently cares less, about consuming his gas to the best advantage; but when he is shown the difference by a practical comparison, he is surprised, and at once becomes interested, because he learns that he can have a more satisfactory light, and oftentimes at less cost. When the consumer understands that the gas company is interested in securing to him the best service for his money, the relations between the company and the consumer become more satisfactory in every respect. I need not say that it is one of the secrets of success in any business to establish the proper relations and confidence between the seller and the buyer, and the success and prosperity of the gas company depend no less on the maintenance of these conditions than do those of any other enterprise where the business of the one depends upon the wants and patronage of the other.

The Question of Fuel Gas.

The London *Journal* says that it is worth while, just at the present time, to watch what is being done in the United States in the direction of the production of fuel gas, upon which two papers were read at the recent meeting of the American Gas Light Association. This is a subject to which a great deal of attention is at present being directed by American engineers; and it is only reasonable to suppose that they have some special reason for what they are doing, and expect to attain some ultimate benefit from their studies. As a matter of fact, we believe that the supply of fuel gas, as a business, is purely "in the air" at present. There are plenty of "processes" intended for the manufacture of gas primarily for use as fuel; but if there are half-a-dozen fuel gas supplying companies in existence, we have not been apprised of the fact. The movement has grown out of the "natural gas" business; and what a British gas engineer would, as a matter of course, wish to know, is the extent of the modifications, if any, which have arisen in the States to render that practicable which has been regarded by common consent as impracticable in this country. The talk of fuel gas is not new in English ears. We are quite used to hearing platform orators speak vaguely, but confidently, of the "cheap heating gas" which English gas companies could distribute, if need were, in place of the more costly commodity in which they deal; but experts know how baseless all such talk is in reality. They know that unless such a gas is to be distributed under pressure, the cost of mains, gasholders, meters, management, and capital would be as heavy for it, however poor, as for the really useful coal gas; and that the manufacturing plant would not cost much less. And it is outside the range of probability that mechanical compression could be resorted to with a view to reducing the bulk of the so-called cheap gas. People who talk about cheap heating gas for town use do not appreciate the fundamental difference between the production of a gas for consumption on the spot, and for distribution over a wide area. Yet they might learn something on this point by comparing the selling price of coal gas in a scattered district and a populous center. How is it that coal gas of the same quality is half as dear again in Dublin as in Sheffield? For one reason, because the Dublin district

is one of the most scattered in the kingdom, while that of Sheffield is one of the most compact. Newcastle-upon-Tyne and Plymouth are other examples of compact districts for gas supply, and also of cheap gas. These are points that the average unskilled critic of gas supply does not comprehend; although he might experience less difficulty in realizing that a railway through a densely populated country may carry passengers more cheaply and make heavier profits than one in a desolate region. Over and over again it has been demonstrated on this side of the water that it would not pay to distribute any gas of less intrinsic value than coal gas, because of the standing charges which any undertaking of the kind would have to bear; yet the very same problem appears to be talked of in the United States as though it were susceptible of a dif ferent solution. No wonder, then, that the discussion is found to be so interesting.

Have we been all wrong in this matter? and is fuel gas really worth distributing in towns as coal gas is distributed? The answer depends in a measure upon what we mean by the term "fuel gas." The most familiar product of the kind which has been experimented with in England is that made by the incomplete combustion of anthracite coal or coke with as much steam as can be added without extinguishing the fire, as in the Dowson apparatus. This producer gas contains a great proportion of nitrogen; and is so weak a fuel that it has never been satisfactorily proved to be worth making for general purposes. A stronger, less bulky fuel is preferable. This means water gas; but water gas can only be made by a great sacrifice of raw material. The coal or coke employed has to be "blown up" into a state of high incandescence by an air-blast, in the course of which operation some of it is burnt; and then steam is decomposed by the glowing fuel, with the result of the transference of some of its heating power into the form of a combustible gas. The loss in the process of conversion is, however, considerable. There is not only the sensible loss of heat in the cupola, but three-fourths of the carbon is blown away or absorbed in the producer gas made while the air-blast is turned on, and only the balance goes into the water gas. The experimenter is thus placed in a difficulty. If he saves the gaseous product of the blowing-up stage, it is only a weak combustible, too poor to ignite cold. On the other hand, it holds a great proportion of the carbon of the coal, which seems, and is, a pity to waste. If he mixes the producer and the water gases together, he simply degrades the latter more than he improves the former; rendering the one unfit for uses to which it might otherwise be adapted without qualifying the whole mixture to take its place. There is no getting out of this dilemma while the experimentalist confines his attention to the coke and anthracite coal with which Dowson generators and water gas apparatus generally were worked.

Finding his water gas from hard coal too wasteful, and his producer gas too good to throw away, yet too poor to sell, the experimenter in fuel gas has perforce turned to bituminous coal, hoping that its hydrocarbons may prove as useful to him as they are to the illuminating coal gas maker. Consequently all the distinctively fuel gas processes of recent origin deal with bituminous coal. They may be divided for the purpose of discussion into two classes—the first including all those arrangements in which the raw coal is fed direct into the generator, which it only leaves in the forms of gas and ashes; the second comprising those in which the coal is carbonized separately, more or less according to the ordinary fashion of coal gas manufacture, as a preliminary to complete gasification. The Loomis process is a good example of the first class of the appliances; while the other refers to a variety of designs in which a gas retort discharges its coke into a gas generator or cupola. The idea of all is the same—the enrichment of the water gas, or of a mixture of the water and producer gases contributed by coke, by means of the hydrocarbon gases distilled from the coal. It does not really affect the principle whether the coal retort is horizontal or inclined, or whether the coal gas is taken off separately, or the coal merely roasted in a current of hot water gas. The grand object is to obtain all the gaseous combustibles with the least possible loss.

Here, however, there is nearly, if not quite, as much waste as in the hard coal systems. The coal, having given up its gas in the carbonizing stage of the process, becomes coke, which must be subjected to an air-blast before it will make water gas. Here appears the old waste. What is to be done with the producer gas? Some of it may be used for heating the retorts, boilers, etc., belonging to the apparatus. But this only disposes of a portion of it, and in any case all the fuel that goes to affect gasification is a debit. We encounter the old difficulty of 75 per cent. of the material put into the generator going to the bad, in the form of producer gas. In other words, besides the coal gas, only 25 per cent. of the resultant coke is utilized; all the rest being wasted. Of course, something may be saved by allowing a proportion of the producer gas to be added to the mixed coal and water gases; but how much of this "letting down" is permissible depends upon the purposes for which the gas is required, and the distance which it has to be conveyed. If they were consulted on the subject, most consumers would say, "I don't want any nitrogen in mine." And if they are not to have nitrogen, the producer gas must be kept out of the mixture.

It therefore comes to this. The old position with regard to the unsuitability, in a commercial sense, of any possible variety or combination of fuel gases for general distribution is maintained. Neither in the United States nor in England will it pay to make a non-luminous gas for general sale. Not only does such a gas compare unfavorably with luminous coal gas, which can do all that fuel gas can claim, and more; but it also fails of proof as an economical way of treating coal. Sir Lowthian Bell's statement is perfectly justified, that "solid coal is not likely to be superseded by any factitious gaseous fuel." At the same time, Sir Lowthian Bell admits the possibility of specially made gaseous fuel being useful under exceptional conditions; and so do we. It would not pay to make and carry everywhere; but it might be profitable in some places. A group of factories, for example, might be advantageously served by a single fuel gas plant; but this is a very much more humble and restricted field than that which some of our American friends think to occupy in this way, to judge by the extent of their preparations. They will have to learn Sir Lowthian Bell's lesson, either from him or from the more costly teacher, experience. "Nothing can be gained, from a calorific point of view, by the proposed gasification of our fuel." This dictum is undoubtedly true; and its truth does not suffer from the consideration that in the arts and in domestic life many applications of fuel exist, in which convenience, cleanliness, and reliability outweigh the mere computation of calorific efficiency. It is in these exceptions to the hard-and-fast rule of calorific value that the openings for gaseous fuel are to be found. Some Americans have been dazzled, by the success of natural gas, into forgetting the conditions under which the distribution of this kind of fuel has been possible—its high compression and calorific value. Unless we greatly err, no artificial fuel gas has yet been made of the same grade as natural gas without sacrificing all the producer gas in the operation. The question arises, therefore, what is the prospect of compressing artificial fuel gas to anything like the average initial pressure of natural gas, which may be about 500 lbs. per square inch in the trunk mains, and selling it for a profit at its fair fuel value? Or, if so much compression is given up as unattainable, how otherwise is the distribution to be effected? The distribution of fuel gas was regarded as an impossible dream when the subject was approached from the standpoint of solid fuel and coal gas. These remain; and it does not appear that the dream is brought any nearer to realization through attempts to regard it by the light of natural gas.

The Phelps Retort Vaporizer.

U. S. Letters Patent (No. 413,762) were granted on Oct. 29 to Lucius J. Phelps, of Passaic, N. J., for improvements in retort vaporizers. The following description of the same is taken from the inventor's specification:

"This invention relates to that class of apparatus by which a volatile hydrocarbon is vaporized and mixed with atmospheric air to produce an illuminating gas, but relates particularly, however, to an apparatus of that class in which the vaporization of the hydrocarbon is effected by heat as distinguished from the well known cold process, in which the vaporization is effected by passing atmospheric air through or in contact with the volatile hydrocarbon.

"It consists in the combination, with the retort and its burner, of a peculiar diaphragm regulator for controlling the flow of vapor to the burner, thereby controlling the heat of the retort.

"In the accompanying drawings Fig. 1 is a horizontal section of the retort; Fig. 2 is an enlarged sectional view of the burner for heating the retort, showing particularly the valve apparatus for controlling the flow of vapor to the same; Fig. 3 is an enlarged vertical section of the retort and its burner.

"The vaporizing apparatus *P*, in which the hydrocarbon is converted into vapor to be afterwards supplied with air to form illuminating vapor, consists primarily of a retort composed of a small cylinder 4, one end of which communicates with the supply pipe *K*, through which the hydrocarbon is supplied to the retort, while its other end communicates with a pipe *G*, through which the vapor passes to the holder. The cylinder 4, forming the retort, is surrounded by a sealed cylindrical water jacket 5, which is partially filled with water, and communicates, through a pipe 6, with a small chamber *S* upon one side of a flexible diaphragm *g*,

which forms a valve for controlling the supply of vapor to the flame which heats the retort. The water jacket 5 is in turn surrounded or partially surrounded by a jacket of wire gauze 7, within which burns the flame for heating the retort to vaporize the hydrocarbon. This flame is fed from vapor issuing from perforations in a horizontal burner *b*, which extends beneath the gauze and in close proximity thereto, and from the perforations of which the vapor issues with sufficient force to pass through the interstices of the gauze to supply the flame upon the inside. The burner *b* is fed from the chamber *S* beneath the diaphragm *g*, which chamber communicates through a small pipe 8 with a pipe *H*, which in turn communicates with the pipe *G*. The diaphragm *g* is so arranged that so long as the water in the jacket 5 and pipe 6 is not heated above the boiling point the diaphragm will remain in such position as to leave the openings to the pipe 8 and burner *b* unobstructed, and thus permit the vapor to flow freely through the pipe 8 to the burner. As soon, however, as the water in the jacket becomes heated above the boiling point, the increased pressure thus caused will depress the diaphragm *g*, and the chamber *S* is so formed beneath the diaphragm that when the diaphragm is thus depressed the opening of the pipe 8 will be closed by the diaphragm, thus shutting off the supply of vapor to the burner and reducing or entirely extinguishing the flame within the gauze 7, which will allow the water in the jacket to cool, and thus reduce the pressure and restore the diaphragm to its original position. The purpose of this will be made clear when the operation of the apparatus is described. The pipe 8 also communicates with a small pipe 9, which terminates just within the wire gauze, as shown in Fig. 3, and is provided with a small lateral opening 1, through which vapor issues to maintain a small permanent flame within the gauze, which operates to relight the main flame produced by the vapor delivered from the burner *b* whenever it has been extinguished by the downward movement of the diaphragm *g*. The pipe 9 is provided with a regulating valve 10, by which the size of this constant flame can be regulated with great nicety.

"The flow of hydrocarbon to the retort is regulated by a valve 18, which is controlled by the gasholder in such manner that when the holder becomes filled to the proper height the valve will be closed and stop the gas making, and vice versa. The end of the retort 4, into which the hydrocarbon passes from the pipe *K*, and also a portion of said pipe next to the retort, are preferably filled with a loose fibrous material 19, through which the hydrocarbon must pass as it enters the retort. This serves to secure a more even and regular flow of the hydrocarbon into the retort, and also to arrest any foreign matter contained in the hydrocarbon. As the hydrocarbon becomes vaporized in the retort it passes through a nozzle 20, located in the opposite end of the retort, and enters a small chamber 21, and passes thence to the pipe *G*.

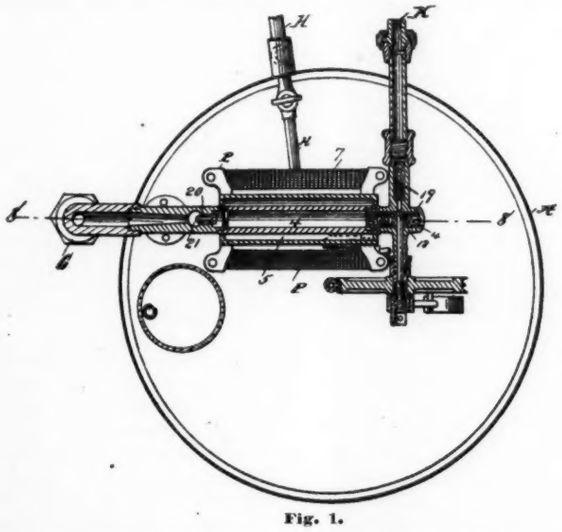

Fig. 1.

"The operation of the machine thus organized is as follows: In describing the operation it will be assumed that the holder is full or nearly full of vapor, so as to be raised to near its highest point. When the holder is in this position it will operate to close the valve 18 and prevent the entrance of hydrocarbon to the retort. No hydrocarbon flowing into the retort, the flame within the wire gauze will quickly heat the water contained within the jacket 5 above the boiling point, and thereby create a pressure within the jacket, which will depress the diaphragm *g*, so as to close the pipe 8, and thus shut off the supply of vapor to feed the flame which heats the retort. This will in turn allow the water to cool, so as to permit the diaphragm to rise and allow the vapor to again pass to the burner *b* and emerge through its perforations and be lighted by the permanent flame at the end of the pipe 9. This will at once raise the temperature of the water in the jacket and again shut off the supply of vapor, and so this operation will be repeated as long as the valve 18 remains closed. The parts will, however, be so adjusted that the amount of vapor consumed in this lighting and extinguishing of the main flame

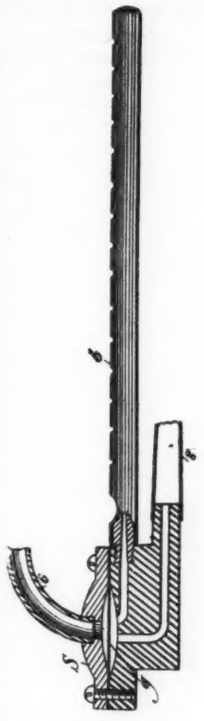

Fig. 2.

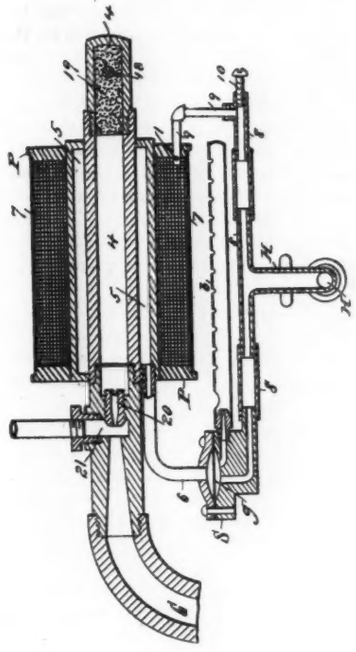

Fig. 3.

will be very small. As soon as the vapor contained in the holder commences to be withdrawn, as will be the case when any one or more burners connected with its discharge pipe are lighted, the holder will fall, thereby opening the valve 18. The hydrocarbon will then pass from the pipe *K* into the retort, and thus lower the temperature of the retort and the water in the jacket 5, so as to reduce the pressure in the jacket and allow the diaphragm *g* to rise and permit the vapor to flow to the burner *b* and be at once ignited by the permanent flame at the end of the pipe 9, and thus maintain the heat of the water in the jacket and the retort so as to vaporize the hydrocarbon entering the retort."

Solvent for Gas Pipe Deposits.

The clogging of gas pipes (both mains and services), being at once a cause of great expense and inconvenience to the gas producers, has naturally attracted the attention of a number of gas chemists, with a view to remove same more readily and economically. The only efficacious method found is the use of a solvent for these deposits, which are principally composed of napthaline, one of the aromatic hydrocarbons. A number of bodies accomplish this, but the majority have the serious fault of either imperfectly enriching the gas even to the smoking point, or impart such a bad odor to the gas or to the combustion products that the solvents had to be discarded. Practical tests have shown that alcohol is the best product heretofore used, but as the expense incidental to its use was so great the majority of the companies substituted for it the cheaper but worse-smelling wood alcohol. On September 24, 1889, a patent was granted to Dr. M. E. Waldstein, for solvents of gas deposits, which appears to unite the desired qualities with a reasonable price, and tests made on a large scale have seemingly verified the claims of the firm that put this new patent on the market.

Messrs. Maas & Waldstein, of No. 44 Trinity Place and 81 Greenwich street, New York, the manufacturers, are willing to give any further informatiou desired. We hope that in this invention one of the difficulties peculiar to the distribution of gas will be greatly lessened if not completely deprived of its power for ill-effect.

The Electric Motor for Domestic Purposes.

Mr. H. B. Prindle, writing on this subject in a recent issue of *Building*, asserts that when the use of the electric current was confined to lighting, at first in public squares and important streets, then gradually extending to cover the entire city or town, and into stores and houses, we were content to know that electricity produced the light in some way, and there our investigation ceased, until, at last, its use became so general as to induce a study and knowledge of its principles. That the same subtle something should become a most powerful agent for the transmission of energy was not for a moment suspected. That it has taken an important position in the world of power can no longer be questioned. Unquestionably the world has never witnessed such remarkable progress in the introduction of power transmitting agencies so radically at variance with previously existing forms. The facts are not to be wondered at when the advantages of electric power are fully considered. The electric motor in its present form is efficient, economical, safe and sure; yet all these advantages would amount to but little were it not for the fact that the range of the adaptability of the motor is so wide. The comparison with a steam plant may perhaps show this clearer. The installation of a steam plant requires heavy foundations, expensive boilers, with their auxiliaries, coal bins, which are a source of heat and dirt. The engine requires the best skilled attendance, and, owing to its complicated nature, necessitates repairs to which the electric motor is not subject.

The electric motor is complete within itself, requiring no auxiliaries—except the wire for supplying the current—needs but little attention, and runs practically without noise. While there is competition between steam and electricity for isolated plants, there is no direct antagonism between the two, as, with the exception of cases where water power is used, steam is a necessary factor in the generation of the electric current. Electricity, therefore, advocates concentration of steam plants—an arrangement the economy of which cannot be denied, and distribution by means of wires or cables, which has been found by thorough practical trial to be the most economical method yet devised.

In applying the motor to domestic uses, it has found a ready adoption for freight and passenger elevators, possessing as it does such marked features of superiority over an isolated steam plant. In selecting a motor for an elevator it is first necessary to determine the amount of horse power which will be required to do the maximum amount of work at the maximum speed. Let us suppose a problem, the condition being as follows:

Passenger elevators, to carry seven persons at a speed of 150 feet per minute; weight of car, 1,000 pounds; of passengers, 1,050 pounds; counter balance, 750 pounds. Substituting in these quantities in the formula:

Net weight × speed per minute × 2 (factor of safety) divided by 33,000 = horse power required.

Weight of car	1,000 lbs.
Seven passengers, at 150 pounds	1,050 "
	2,050 "
Counter balance	750 "
Net weight	1,300 "

1,300 × 150 × 2 = 390,000 ÷ 33,000 = 12-horse power required.

Worm gears require more power on account of friction than spur gears, but this is amply provided for by the introduction of the safety factor of 2.

In applying electricity to elevators, there are two methods which can be used: the indirect and direct. In the former the motor transmits its motion to a counter shaft. The elevator machine is belted to this counter by straight and crossed belts, which are shipped by a wire rope running through the elevator, the same as when the motive power is supplied by steam. In this case the motor is kept running at all times.

The direct method is used in connection with water power, but is subject to three divisions:

1st—Where the motor operates only when elevator is in motion.

2d—The gravity tank.

3d—The pressure tank.

In the first instance a series-wound motor is used, geared directly to the elevator machine, but is only put in operation when the elevator is in motion. The regulating devices are generally placed in the elevator car, and consist of a resistance by means of which the motor can be started and stopped gradually, and a reversing switch, which changes the direction of rotation of the motor, according to the direction in which the elevator car is moving.

In the second instance the motor is geared directly to a pump which pumps the water to a tank situated on the roof, or some elevation specially provided, the pressure in the elevator cylinder being determined by the head of water thus secured. The regulation of the motor is obtained by means of a float placed in the tank, connected directly to a variable resistance, by means of which the speed of the motor, and consequently the amount of water in the tank, is increased or diminished, as the case may require.

In the third instance the motor is geared directly to the pump, and both are kept running at a constant speed. The regulation is effected by using, in the pipe leading from the pump to the pressure tank, a diaphragm connected to a return pipe to the supply tank, and a check valve. When the pressure reaches a certain amount the diaphragm opens, cutting off the supply of water from the pressure tank. The check valve then closes, thus maintaining a constant pressure in the tank, while the water merely circulates through the pump and the supply tank.

All of the above-mentioned methods are thoroughly practical, the question of which is the most advantageous to use necessarily depending upon local conditions.

That the electric motor can be successfully applied to the practical working of freight and passenger elevators is abundantly proved by many installations in all our large buildings, where it may be seen in daily operation.

The Directorship of Gas Companies.

The following article (contributed to the London *Journal* by "A Looker-On") will make an interesting supplement to the article in this issue of the JOURNAL (see page 787) from the pen of Mr. Slater:

It may be regarded as somewhat heterodox if one ventures to hint that the present system of conducting the affairs of a gas company, by means of a board of directors, a secretary and a manager, is not all that may be desired. Yet those who follow closely the events that happen in gas circles cannot but have repeatedly noticed in late years various matters requiring attention that are inadequately dealt with by the existing staff; and this not necessarily by reason of any personal ignorance or negligence, but on account of defects in organization. How often has it happened that the cumbrous method of sending an official document to the secretary, waiting till the next directors' meeting, receiving a reply more or less filtered through the personality of this official, and perhaps repeating the process two or three times, has allowed opportunity for a slight misunderstanding to burst into a furious quarrel, or for a trifling grievance to become magnified into a deep seated and lasting discontent. Frequently the matter in dispute is one on which the directors have very little personal knowledge, and their so-called "decision" is very little more than a blind adoption of the recommendations of their officials; in which case the appeal to the board is simply an unnecessary, cumbrous and unwieldy method of settling a matter that might have been disposed of in an hour or so in the first place. How frequently it happens that the directorate occupy the position of a secret council altogether out of touch with the consumers. It really would be a good thing if such directors could hold a sort of "at home," in order to make the acquaintance of their principal customers, and thus avoid the suspicion and distrust which seem to attach to the doings of "the board." An instance of this is to be found in the fact that the gas undertaking is always more successful where the directors are selected from the principal and best selected inhabitants of the district than where they are comparatively obscure or perhaps live in another town.

Too frequently the selection of a candidate for a directorship is brought forward from motives other than a personal fitness or ability for the office—such as the possession of a considerable amount of stock, or the desire to meet the wishes of a large shareholder. In towns of any size there is always a good selection of candidates amongst the proprietors or managers of important business enterprises. But in small towns, there is a sparseness of the proper material; and a shareholder may be elected whose only qualification is a willingness to serve. When put into office, the incompetent director is not usually satisfied with acting the part of a dummy; and evidence of his existence on the board is usually furnished by actions of a negative kind. He opposes the outlay of a few hundred pounds on a much needed extension of plant, with the result that the supply of gas is insufficient during the dark season, or the manager is obliged to resort to temporary expedients of a costly nature. Fully imbued with the idea that his duty is to look after the shareholders' money, he opposes expenditure for repairs that are really necessary; and when the opportunity for liberal but judicious en-

terprise in the way of purchase of land, special concessions in order to secure a particular line of business, and so forth, arises, it is likely to be lost on account of the over-cautious opposition exhibited by the incompetent director. It is not uncomplimentary to say that directors rarely err on the side of rashness or excessive enterprise; but possibly they may lean too far in the other direction.

The secretary is usually supposed to be merely the servant or mouthpiece of the directors; but, as a matter of fact, he is often, to all intents and purposes, one of them. He is supposed to have no vote; but his influence is practically as good as a casting vote. If he also occupies the post of manager, or otherwise devotes the whole of his time to the service of the company, there is no special objection to this; but where, as is often the case, he simply keeps the register of shareholders and the directors' minute book, he can scarcely possess much acquaintance with the "ins and outs" of the undertaking, and therefore is not so well qualified to express opinions about it as those who understand it thoroughly. Some of our best-managed undertakings are characterized by the possession of good, competent secretaries, who shake down well into their position between the directors on the one hand and the manager on the other. It is advantageous if the secretary possesses, in addition to a sound commercial knowledge of gas matters, some technical acquaintance with the principles of gas combustion, and especially with the appliances by means of which gas is utilized for lighting, heating, cooking, or technical purposes. A competent official is often able, by the exercise of judgment and tact, to smooth away little difficulties and misunderstandings, and generally to facilitate a satisfactory settlement of all matters pertaining to his undertaking.

The duties which might appropriately be discharged by a competent manager—for example, a keen grasp of the various uses to which the gas is applied by the customers, with a view not only to the retaining of existing business, but to extension in every legitimate direction—are those which are specially neglected under the present system of administration.

The directors, secretary, and manager between them may possibly do a little, in a feeble, desultory manner, in the way of pushing the extended use of gas. But a small user of power may puff out his little cloud of steam just by the gas works' gates from one year's end to another, and yet it is nobody's business to bring before him the advantages of a gas engine. The proprietor of a cook shop over the way may possibly prepare hundreds of dinners daily, and yet no one has ever suggested to him the subject of cooking by gas. Matters have certainly improved in this respect lately, but there is still much to be done. There is probably not a gas office in the country, at the present time, where an application for a service to be laid on would be treated with the *nonchalance* or indifference that was not uncommon some 20 or 30 years ago. But yet the efforts in the way of extending gas business seem to be hampered and cramped. There is a spasmodic display of energy on the occasion of a gas exhibition, or a popular lecture; but it subsides as rapidly as it arose. The chief reason of this lethargic dullness is the indifference of the directors. The officials find that any efforts on their part are not appreciated, and perhaps not backed up by the board. At the same time they are not authorized to take any decided step without consulting the directors. Consequently the retaining and extension of business is left to take care of itself, instead of receiving that careful attention and nursing that is usually bestowed upon it in other commercial undertakings. We have heard that certain large firms retain the services of an advertising agent. If they find it worth their while to do this, surely the gas directorates would do well to see that this department receives proper consideration.

Attention has so far been directed to the commercial side of gas administration; but there is something to be said about the technical part. In the matter of what is called gas engineering the directors are entirely in the hands of the gentleman who is usually spoken of as the "manager," but who might be more appropriately distinguished as the "engineer," or, if preferred, "technical manager." If they are not satisfied with the decisions of this official in regard to the purchase of coals or other material, or to other arrangements in connection with the technical operations, their best plan will be to get a successor, in whom they can place full reliance. It is idle to suppose that the directors, by virtue of intuitive wisdom on their part, can make up for any presumed deficiency, or supplement the practical knowledge of their engineer; yet how often instances are to be met with in which something of the kind is attempted. The engineer reports that certain extensions are urgently necessary; but the directors tacitly refuse to believe him by repeatedly shelving the question, on one pretence or another. In respect to working results, how frequently a gas engineer is handicapped by injudicious purchases conducted by the directors, either contrary to, or without his advice. Especially is this noticeable in regard to coal contracts, which many appear to regard entirely as a matter for the board. The directors can clearly appreciate the difference between coals at 9s. and coals at 10s. per ton, but not very much more; and if the official who is responsible for the working of the materials to the greatest advantage is not able to decide as to those best suited for this purpose, or is not to have a voice in their selection, who is? The directors may be good men of business, and may perhaps have a little insight into technicalities; but it is extremely improbable that they will have a good knowledge of technical operations, as conducted at their own works, as the individual who has these operations continually before his mind. This point also applies, to some extent, to the commercial questions brought before the directors.

The great defect of the present arrangement is that it enables a director, who may be very scantily informed on the point at issue, to exercise a greater authority than those who are really intimately acquainted with the matter. The permanent salaried officials are selected with care; and any negligence or ignorance on their part is at once evident, and will be dealt with by the directors. But the ill-effects of ignorance or want of judgment on the part of the directorate may frequently escape notice. And if gas companies are to be successfully worked amid the competition that seems to be gradually, though slowly, closing around them, it is necessary that there should be a clear and intelligent comprehension of the whole working, coupled with energy, on the part of the directorate, especially in the development of new business. I need not pass in review the modern forms of enterprise—such as gas exhibitions, either of a temporary character, or permanent in the form of a show-room; the delivery of cookery or other lectures; the allowance of discounts for special lines of business; the letting of stoves, and especially of fittings, on hire. These are generally well known, although so little energy in the way of adopting them is the common experience.

SPECIAL ENGLISH CORRESPONDENCE.

COMMUNICATED BY NORTON H. HUMPHRYS.

SALISBURY, Nov. 9, 1889.

The Labor Question.—Gas Business in France.—Supervision of Meters.

The chief topic of the day is the labor question. The successful manner in which the dock laborers in London secured their increase in wages has to some extent served to unsettle all classes of labor. The assistance afforded by combination amongst the laboring classes as a means of securing increased rates of pay has become popular to a great degree, and there are not wanting shrewd persons of the public agitation class to take advantage of these sentiments. But there is a tendency to overlook the fact that the dock laborers could come before the public with a very substantial list of grievances. Public sympathy was aroused to such an extent as to bring a considerable amount of outside pressure to bear in the direction of yielding to the demands of the men, and it may be questioned whether this factor was not more important in their interest than anything done in the way of organization or combination by themselves or their representatives. That the latter party fully appreciate the value of public support is evident by the fact that they do not hesitate to put forward exaggerated and highly colored statements, of which the assertion that the labor of a gas stoker is of such an arduous nature as to shorten his life and bring on premature old age is an example. In this they are assisted by the fact that some classes of labor employers—gas directors, to wit—do not always enjoy the sympathy and good will of the public. A determined move, chiefly promoted by an agency in London, is being made throughout the country in favor of eight-hour shifts, which means three gangs instead of two in the 24 hours. It should be stated that many gas engineers are in favor of this arrangement, and that as a general rule very little objection would be raised against it except, of course, in works too small for it to be conveniently applied. In addition to this, however, the men, or rather their self constituted representatives, show a tendency to be overbearing. They are demanding considerably less work in some cases—a smaller number of retorts per man, and so on—so that the question of what is a fair day's work is likely to become rather obtuse.

The difficulty, from the point of view of the gas director, is that the times are not favorable for a larger increase of wages. A substantial rise has lately taken place in the price of coal, equivalent in many cases to an addition of 8 cents per 1,000 cu. ft. of gas to the working expenses. A part of this will be recouped by higher prices for residuals, but there will be an actual deficiency of about 4 cents. The average rate of wages is about 8 cents per 1,000 cu. ft., and the demands made in some towns will, if acceded, increase this item more than 50 per cent. On the other

hand, the public are calling for cheaper gas, and there is the gradually developing competition of oil and electricity to be met. Any attempt in the way of increasing the price is at once resisted with indignation. So the directors are in the position of being called upon to make the full tale of bricks, and yet to have some of their straw stopped. It may be suggested that the shareholders should accept less profit. A large portion of the capital invested in gas undertakings in this country has been subscribed for in the faith of a parliamentary guarantee, which limits the rate of profits payable according to certain conditions, and such is the feeling of security established by this Act of Parliament, that in many cases the capital realizes nearly double its nominal value, the balance being applied to the capital account of the undertaking, and, of course, not ranking for dividend. So any reduction of profits would be a real hardship to the investor, and would only be a temporary benefit to the gas consumer, because it would have the effect of diminishing the value of gas stock, and render it impossible to raise fresh capital upon such favorable terms.

It has frequently been remarked that the gas industry may be specially regarded as a friend to the working man. In the erection of the plant, the laying of mains, etc., a large amount of labor is employed. In the revenue expenses, including wages paid in connection with repairs, etc., about 25 per cent. of the price received for gas is paid away as wages to the working men. There are many gas managers who have refused to employ labor-saving machinery, simply because they did not wish to reduce the number of hands employed. The new attitude of the men is likely to prove a rude shock to this sort of thing. One large town in particular comes to mind, where the introduction of stoking machinery was opposed, some years ago, as likely to reduce the weekly wage sheet. On the 1st of this month the stokers and retort house men in that town received a large increase in wages, which they secured by force in the shape of a threat for a general strike. What will the advocates of manual labor say to this? Apart from the present demand, there is the feeling of insecurity as regards the future. How is it possible for a gas engineer to make these changes in arrangements that are necessary to meet the ever varying demand, if all his men are combined in a union having certain rules of a more or less arbitrary nature, which he must not infringe under fear of a strike? The present attitude of the laboring class in England is directing the attention of gas engineers to two points. One is the necessity for a larger holder accommodation than has hitherto been considered sufficient, so as to be provided against emergencies that so far have not been expected; and the other is the question of stoking machinery, and generally as to systems of carbonizing that require less manual labor than those at present in vogue. Machinery for the transit of dry materials, such as coal, coke, oxide, etc., has been found very little if any cheaper than hand work; but under the new regime this objection no longer obtains. Indeed, it becomes advisable to consider the introduction of machinery where practicable, even if the saving so secured is *nil*.

Respecting the London dock strike, it is stated in the *British Trade Journal* that without exaggeration the strike may be estimated to have resulted in a loss, or a postponement of the exportation of, three-quarters of a million worth of English and Irish products, such as yarns and textile fabrics, articles of food, drink, chemicals and medical preparations, apparel and articles for personal use, etc., besides £1,600,000 worth of foreign and colonial produce. In other words, the profits on shipping for exportation about £2,500,000 worth of goods have been lost or deferred. The exports of material such as coal and iron were not affected, since they are sent out from other ports.

According to some official statistics lately published in France, the development of the gas industry in that country during the last 15 years or so has been little short of phenomenal. In 1872, 530 towns, with an aggregate population of 8¾ millions, used 260 millions cubic meters of gas. (A cubic meter = 35.3 cubic feet). In 1878, 687 towns. with a population of 10 millions, used 382 millions cubic meters, and the make was 430 millions. So that in the six years ended 1878, there was an increase of 25 per cent. in the number of towns, of 13.5 per cent. in the population, and 31.4 per cent. in the consumption of gas. In addition to actual increase by addition of new consumers, the consumption per head was augmented. In subsequent years the production has increased irregularly in quantities ranging from 10 to over 20 millions, and in 1888 the total production was 628 million cubic meters. It is noticeable that this large increase between 1872 and 1888 has not been attended by anything like a commensurate increase in the population supplied. In 1888 1,001 towns were supplied with gas, so it appears that over 300 new gas works were started in France during the last 16 years. In the last 11 years the increase in the population supplied has been 27½ per cent., but the production of gas has increased 46½ per cent., or nearly double.

These figures are the more remarkable because the increase in the use of gas stoves and engines, which has been so noticeable in England and America during the past few years, does not obtain in France. The gas is dear, and there is a difficulty in obtaining the best forms of apparatus. So the bulk of this increase may be put down to an increased demand for lighting purposes. All over the world the demand for more artificial light seems to be general. In large shops and places of amusement, people will have a perfect blaze of light, regardless of expense. The influence naturally extends to smaller establishments and private houses, with the result that No. 5 burners are now put in where No. 3's were formsrly used, and three or four burners are now demanded where two were considered sufficient. Everywhere there is a demand for more light, and gas people should not rest satisfied with merely holding their own, but also see that they get a proper share of the new business. It is all very well to report that the gas consumption shows a satisfactory increase, but if at the same time the number of oil lamps used in the district has doubled, and a large electric light plant has been set up, there is room for a question as to whether the increase, with more spirited management, might not have been still more satisfactory.

I have just received a copy of the American Gas Light Journal containing the first instalment of the proceedings of the American Gas Light Association. The spirited discussions form refreshing reading after the tameness and lack of energy that is at present a noticeable feature in our own Association. At the last meeting of the Gas Institute there were only four papers, and our district Associations often have only one paper, and sometimes none at all. What with fuel gas, water gas, natural gas and electric light, to say nothing about details of coal gas workings, American gas engineers seem to have good discussions, whilst Englishmen find scarcely anything to talk about. I am especially pleased with the discussion on a paper by Mr. E. C. Jones, which shows there is still something fresh to be said on such an old subject as leakage.

The proclivity of dry meters to pass small quantities of gas unregistered is one deserving of careful attention, and I can assure Mr. Sherman that in England also there are many consumers who receive their night lamps gratis. In most of our large towns the meters receive periodic attention, and as a result the leakage (?) does not exceed 5 or 6 per cent. In small districts this cannot be done, chiefly because the directors are niggardly in regard to the staff, and expect that a manager and a clerk can see to everything. I am sure that the necessity for strict and systematic inspection of the meters cannot be too strongly insisted upon, as, however absurdly low the registration may be, it is very difficult to get a consumer to pay for more than the meter shows.

ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

Messrs. Bartlett, Hayward & Company, having purchased the right to manufacture the Mills' reversible lime trays for gas purifiers, will hereafter furnish the same from their Baltimore factories.

Mr. J. H. Flagler has resigned the Presidency of the National Tube Works Company, of McKeesport, Pa., and Mr. E. C. Converse was chosen in his place. The city offices of the Company have also been removed to the Guernsey building, 160 to 164 Broadway.

The Westinghouse Machine Company is engaged in installing an electric plant on its works with the avowed intention of illuminating the place at night so thoroughly that the manufacturing operations of the concern can be carried on throughout each 24 hours. A combination of incandescent and arc lights will be used for the purpose. The former will be distributed through the more confined spaces, while all large areas will be lighted by arcs. The Company is organizing a complete force of night workmen and as it is believed that these workmen will henceforth find continuous employment in the Westinghouse shops, of course, it is important that proper provision be made in respect to the method of illumination under which their labor is to be performed. It will be interesting to note whether the Company's idea—they are acting under the premise that because of the completeness and efficiency of the lighting means about to be adopted the night workman will do as much work as his day confrere—can be successfully carried out.

The contract for the public lighting of the Hudson City and Bergen district of Hudson county, N. J., has been awarded to the Peoples Gas Light Company, on the basis of $19.50 per lamp per annum; the Greenville district lamps are to be maintained by the Consumers Gas Company; and the Lafayette and Jersey City districts will be supplied by the Jersey City Gas Company. The rate in the latter sections is fixed at $18 per lamp. The oil lamps in the above territory (about 1,500 in num-

ber) will be cared for by the New York and New Jersey Globe Gas Light Company, which agreed to furnish the illuminating vehicle required at a cost per month of $1.68 per lamp. It will be noted that the gas service is to be carried on at a very low figure.

It is more than likely that the authorities of Beverly, N. J., will soon enter into a contract for the lighting of the streets by electricity.

Wm. H. Fisher, formerly collector in the service of the Johnstown and Gloversville (N. Y.) Gas Company, has been discharged by Supt. Lorenz. Fisher was about $200 short in his returns, but the deficiency will be made good by his bondsmen, the Casualty and Fidelity Insurance Company, of this city.

The Beverly (Mass.) Gas Light Company will extend its wharf on the Bass river, and will dredge and deepen the channel approach. This will benefit the Company in the matter of the reception of its supplies.

The Chicago plan of collecting gas accounts is to be tried in Boston, the Boston, Charlestown, Roxbury, South Boston and Dorchester Gas Light Companies having made arrangements under which the American Express Company will receive payment of gas bills at any of the regular or branch express agencies in the city or suburbs. The agencies of the express company are authorized to receipt gas bills, and will do so on payment by consumer of bill and fees, viz.: On bills of $5 and less, 5 cents; on bills of $5 to $10, 8 cents; on bills of $10 to $20, 10 cents. Money cannot be paid express agents unless the Company's regular money order is issued therefor, the receipt for which is to be retained by purchaser. The usual discount will be allowed on all gas bills paid on or before the date specified on the bills, and no moneys will be received by the express company after the expiration of the regular discount date.

Captain Lusk, of the Public Works Department, Washington, D. C., having referred in his annual report to the public lighting of that city, gives it as his opinion that the District Commissioners should have some control over the size of gas mains to be laid in the streets, and suggests that legislation should be sought which would secure that control. He also is under the belief that no gas main should be put down without the preliminary of a plan showing the exact location of the same having been presented to the notice of the Commissioners. With all due respect to the Captain's suggestions, we beg leave to submit that he might with equal propriety ask for the passage of laws that would secure to the District Commissioners the right to say what sort of coal the Company should carbonize in its retorts.

The Boston Electric Company has instituted suits against Charles W. Holtzer and the Holtzer-Cabot Electric Company, in the nature of a motion for the issuance of a preliminary injunction to restrain defendants from the use, manufacture and sale of certain electric lighting apparatus, which complainant asserts are owned solely by it. The Nos. of the patents in question are: 230,590, dated July 27, 1880, granted to George F. Pinkham, and 281,345, dated July 17, 1883, granted to Chas. Crockett. The defendants make a general denial.

The Journal of the Statistical Society of Paris, France, says that at the Exhibition of 1878 it was shown that the gas consumption of France, which amounted in 1872 to 260,000,000 cubic meters in 530 towns, with an aggregate population of 8,757,600 souls, had risen in 1878 to 382,000,000 meters in 687 towns, with a population of 9,943,000—plus unaccounted-for gas the production amounted to 430,000,000 cubic meters. In six years, therefore, there was an increase in the number of towns of 25 per cent., of 13.5 per cent. in the population, and 31.4 per cent. in the production. In 1880 the production amounted to 507,800,000 cubic meters, in 1885 to 589,100,000 cubic meters, in 1886 to 600,700,000, in 1887 to 610,000,000, and in 1888 to 628,000,000 cubic meters. The figures for the last two years are approximate only. The towns lighted by gas numbered 687 in 1878, 914 in 1883, and 1,001 in 1888, the population being 9,943,400, 11,840,000, and 12,680,000, respectively. The increase, therefore, since the last Exhibition, in the number of towns lighted by gas, amounts to 314, or 45 per cent.; in the number of inhabitants, to 2,736,000, or 27.5 per cent.; and in the production of gas, to 200,000,000 cubic meters, or 46.5 per cent.

A case of more than ordinary interest to the managing foremen of gas works throughout the country was illustrated in Hartford, Conn., the other day, the occasion being the filing of a remonstrance to the County Commissioners against granting licenses to a certain number of liquor saloonkeepers, whose shops were in and about the vicinity of the gas works. The testimony in remonstrance seems to us so interesting that we herewith reprint a summary of it—we might introduce the evidence in the remark that the saloonkeepers were represented by Lawyers Steele, Adams, Coogan, McLean and Brainard. Mr. John P. Harbison, of the Hartford Gas Company, said that the Company's business interests were seriously affected by the number and proximity of the saloons, because the Company's workmen were frequent visitors to the places complained of, not that the money squandered by the employees amounted to so much as did the physical condition which such expenditure reduced the men to. "The greatest difficulty we have," continued Mr. Harbison, "is the continual tippling of the men whenever they have an opportunity to get outside of the gates. It is in reality a pretty serious matter to the Company, to the men themselves, and perhaps might be to the city, to have men under the influence of liquor about the gas works. We accordingly believe that it is within the police province of the authorities, in their efforts to promote the welfare of the city and the workmen, to determine that liquor establishments shall not be licensed within certain distances of not only gas works, but all other large manufacturing works." Ex-Lieutenant Governor James L. Howard (he is also President of the Gas Company) said that it would require no argument to prove that men, and especially workingmen, are better off without intoxicating drink. "We about the gas works and other manufacturing interests in that part of the city," added Mr. Howard, "ask for the same protection that your Honorable Board accorded the Weed and the Pratt & Whitney Companies. These men whom we employ receive but limited wages, owing to the nature of their services, and you might properly take account of the privations to their families which an indulgence in constant drinking occasions; yet we do not speak from that standpoint but simply appeal to you as manufacturers whose interests are injured by the granting of saloon licenses right at the doors of our works." Mr. Beach, who represented another manufacturing establishment, spoke of the injury occasioned to the men in his employ through the nearness of the saloons complained of, and added: "We are constantly though reluctantly obliged to discharge good workmen whom we could retain but for the source of evil remonstrated against now." Mr. Harbison then reinforced his former testimony by explaining that it was a serious drawback to the Company to be compelled to discharge a competent man, or who would be thoroughly competent but for the ease with which he could purchase strong drink, and then went on to say: "In 25 years I do not know of a single case where an experienced man has been discharged from our works for any other cause than that of intemperance. We have from 50 to 75 men in our employ, more than 75 per cent. of whom reside in the district about which this remonstrance is made. About 20 men are at work in our retort house, and as these men are not always actively at work, between times they frequently slip out to the saloon. I am not a prohibitionist nor a no-license man. I have gone so far as to say to my men that I would provide a box with ice and sawdust in which they might keep their beer bottles cool if they wished to drink beer with their dinner. I should not object to that, but I do object to their constant tippling, which is made possible by the lavishness with which saloon licenses are granted by the Board." Other testimony was submitted, and then the saloon keepers' attorneys presented their argument. The high morality of the liquor sellers was expatiated upon, and the right of every man to earn an "honest livelihood" was fully detailed. Of course, the attorneys did their best, but they had a poor cause, and we will, therefore, desist from making an extended synopsis of their arguments, although we will submit one rather queer remark made by lawyer Coogan. He urged that the present case could not be compared with that cited by Mr. Howard in his reference to the Pratt & Whitney Company [the latter firm some weeks ago appeared before the Board in remonstrance to the granting of certain licenses for saloons in close proximity to their works, and the Board refused to grant the licenses], since 1,000 employees were affected thereby, whereas in the present instance only 75 workmen were subjected to the temptation afforded by an abundance of saloons. This in effect seems to us to be an admission that it was only worth while (in lawyer Coogan's opinion at least) to consider the bettering of the condition of the Hartford workman when he could be got at in batches of 1,000—an ordinary 100 being of no account whatever. The Board reserved its decision, pending a personal investigation of the situation. This matter of the multiplication of saloons in the neighborhood of gas works ought to be resisted by the proprietors of the companies, and the opposition need not in any sense rest on philanthropical arguments or reasons, either. It ought to be fought out on the line of the baneful influence of the saloon on the material prosperity of the business interests involved.

THE Oakland (Cal.) Gas and Electric Light Company has added a 50-light arc dynamo of the Thomson-Houston type to its electrical plant.

THE Pacific Lighting Company, which possesses the contract for supplying public electric lights in the towns of San Bernardino and Colton, Cal., has experienced much trouble over the inequality of the water supply from which it derived its power. In order to guard against like trouble in the future it has been determined to install a 50-horse power gas engine.

THE Company at Riverside, Cal., having satisfactorily determined that there was no money in furnishing a 16-candle power incandescent electric lamp at a charge $1.50 per month has determined to increase the rate to $2.

WHEN the contract for the public lighting of Attica, N.Y., expired the Trustees at once entered into a new compact with the Attica Gas and Water Company, the proprietors of which agreed to carry on the service at the rate $17 per lamp per annum, the ordinary moon table to be followed. This was supposed to be final, but at the meeting following the one at which the contract was ratified certain electric speculators asked the Board to rescind the agreement in order that they might submit a proposition. This cool request was negatived, but nothing daunted the speculators returned to the charge at a subsequent meeting. The Board then "resolved" that the electricians be given permission to say at what figure they would agree to furnish 30, 40 or 50 incandescent electric lights (25-candle power each), the same to be employed to supersede all the present oil lamps and "a portion of the existing gas light as well." The bids were to have been opened last week, but we have as yet no knowledge of the action then taken. We give this merely as a sample of the facility with which public authorities make and break agreements, although we presume that our readers do not as a rule require evidence of the unreliability of the average public authority—be the latter concerned in the management of the affairs of a huge city or in the direction of the affairs of a village.

THE following is a copy of the invitation submitted by Mr. George H. Allen, Superintendent of Lamps, Boston, Mass., to bidders in the competition for the public lighting of that city: "Sealed proposals will be received * * * for furnishing electric lights for public street lighting for a term of one, three or five years from the date of the contract. Each lamp will be required to burn every night in the year from sunset to sunrise in accordance with terms which will be furnished upon inquiry at this office. Separate proposals will be received for city proper, East Boston, Charlestown, South Boston, Brighton, Roxbury, West Roxbury and Dorchester. Proposals must specify the system to be used in lighting, the illuminating power of each lamp, and be accompanied by an agreement to run electric wires to all electric lamps that may hereafter be located in the several districts for which contracts are awarded."

THE State Board of Gas and Electric Light Commissioners held a hearing at the Selectmen's room, Wakefield, Mass., on the 20th ult., upon the petition of the Citizens Gas Light Company for permission to engage in the business of generating and furnishing electricity for light and power and for manufacting purposes in Stoneham, Wakefield and Reading. The officers of the Company appeared in support of their petition, and made a good argument. Decision was reserved, but it is likely that a favorable answer will be returned.

FRANK FOSTER, a lineman at Gloucester, Mass., was instantly killed by an electric shock received while making some repairs to a defective street lamp of the arc type.

MR. A. F. Stack, who is the virtual owner of the Hillsdale (Mich.) Electric Light Company, has purchased the franchise and works of the Hillsdale Gas Light Company. Mr. Stack says that he will next spring make important alterations on the gas works division of his property.

COUNCILMAN FAY has presented a communication to the Trenton (N. J.) Council in which he recommends the purchase by the city of an electric lighting plant, the same to be operated on municipal account.

THE La Grange (Texas) Water, Electric Light and Power Company has been incorporated.

THE proprietors of the Lewistown (Me.) Gas Light Company report that the Company's output is increasing rapidly.

THE improvements at the Alton (Ills.) Company's plant are being pushed rapidly.

THE Messrs. A. & W. S. Carr Company, 138-140 Center street, this city, report a very good enquiry for their specialities—plumbers' and machinists' supplies. They have just completed an addition (110 feet in length by 40 feet in width) to their factory buildings at Paterson, N. J.

THE proprietors of the Zanesville, O., Gas Light Company, are again to the front with a reduction in selling rates, an announcement having been made by them a fortnight ago that on and after December 1st the selling price would be put at $1.25 per 1,000. The Zanesville *Daily Signal*, in announcing the fact, made the following comments thereon: "Elsewhere is a local notice to the effect that the Zanesville Gas Light Company has determined to reduce the price of gas from $1.30 to $1.25 per 1,000 cubic feet, the reduction to take effect on December 1st. This action on the part of the Gas Company is but an earnest of the good faith which the Company holds towards the city. This reduction is made in accordance with a liberal and business rule adopted by the Company, which contemplates a reduction whenever the business done by it shall warrant it. No reduction was asked for at this time. There was no pressure brought to bear to secure a reduction. It was made by the Company because the business justified it. The Gas Company got a temporary backset when the electric lights took the place of the gas street lamps, but the Company has recovered from that 'shock,' and the additional business it is now doing in the way of furnishing gas to private consumers, especially for gas stoves (400 of which are now in use), has given the business such a boom that the Company feels constrained to reduce the price. And it is the intention of the Company to pursue this policy in the future—the policy of reducing the price as the increase in the business shall make it justifiable." Supt. Printz is just as capable and conscientious as ever, and it is with great pleasure that we congratulate him upon the continued success and increasing prosperity of his Company.

MR. DUDLEY P. ELY, who has acted as President of the Norwalk (Conn.) Gas Light Company for something like a period of 20 years, has disposed of his stock in the enterprise to Messrs. E. and E. J. Hill. It is understood that Mr. E. J. Hill will succeed to the Presidency.

THE Crawfordsville (Ind.) Water and Light Company has been incorporated by Messrs. Jno. L. Brown, Peter C. Sommerville and Warren H. Ashley.

LAST Monday application was made to the Syracuse (N. Y.) Council for a gas works franchise. We understand that W. L. Elkins, Jr., is the one most interested in the petition.

CONSTRUCTION work is now under way on the gas plant for Pierre, S. Dak. According to the terms of the grant the works must be completed and in operation by January 1, 1890.

CITY CLERK MCKEE, of Sacramento, Cal., will open bids next Monday for the lighting of the city's streets for a term of two years from December 15th.

A CORRESPONDENT writes that Mr. O. P. Ricker, representing the Westinghouse Electric Light Company, has been consulting with the Directors of the Belfast (Me.) Gas Company, and it is more than probable that the result will be the installation by the Gas Company of an electric plant. While all the details have not been arranged, our informant thinks that the electric annex will be fitted for the supply of both arc and incandescent lights.

THE Bureau of Electrical Measurements, of the John Hopkins University, of Baltimore, has instituted a series of elaborate tests of the efficiency of dynamo-electric machines, etc., and the experiments or tests are being carried out at the Bayard street station of the Consolidated Gas Company. Dr. Louis Duncan is in charge, with Dr. Gustav A. Liebig assisting.

IN connection with the electric lighting squabble at Alexandria, Va., we note that two attachments were sued out on the 23d ult. against the Schuyler Electric Light Company, by Messrs. N. L. Cox and C. L. Neale, Jr. The attachments were served upon Mayor Dunham and the Finance Committee of the City Council to stop the payment of the money due the Schuyler Company by the city, until claims by the parties named, amounting to $6,500, for services said to have been rendered the Company in connection with the Lynchburg, Va., lighting contract, can be adjudicated. The facts in the case, as stated by the claimants, are substantially that through their energies the Schuyler Company secured the contract for the lighting of the city of Lynchburg by electricity, for which they were to receive the sum named. Subsequently the

contract was revoked by the failure of the Company to give the resident bond demanded, and that compensation was then denied claimants, who now assert that having performed their labor they are entitled to their pay.

COUNCILMEN MORAN AND WARDELL recently submitted to the Board of Finance, of New Haven, Conn., a proposition made by the local electric light company in respect to the public lighting. Under the present contract the electricians supply 157 high candle power arcs to the city, and are paid therefor at the rate of 50 cents per lamp per night; but the contractors now ask the city to authorize the maintenance of 300 arcs (1,200-candle power each), to cost 37 cents each per night, provided a three-year contract can be agreed on. It is said that the Lamp Committee of Council looks favorably upon the proposition.

A SUMMONS has been served in an action brought by the Oshkosh (Wis.) Gas Light Company against the city authorities and the Oshkosh Electric Light and Power Company to restrain the former from awarding and the latter from carrying out a contract for the public lighting. The chief basis of complainant's claim is the fact that in the tenders for the work its figures were the lowest.

THE authorities at Little Rock, Ark., are not so enthusiastic now over their municipal electric lighting system as formerly. Bills for repairs to generating plant and distributing line are heaping up a trifle too rapidly.

THE proprietors of the Mutual Gas Light Company, Southbridge, Mass., have purchased the plant and franchises of the Southbridge Electric Company.

THE funeral of the late Henry T. Reeves (who died in Florida on Saturday, Nov. 16) occurred at his home in Beaver Falls about one week later. Deceased, who was born on October 14, 1827, was President of the Beaver Falls and New Brighton (Pa.) Gas Company, the Beaver Falls Water Works, and the Beaver Falls Cutlery Company. He was also on the board of management of the local Economy Savings Institution.

AMERICANS who contemplate visiting Havana, Cuba, and particularly those whose past experience has familiarized them with the wretched water supply of that city, will be pleased to know that a contract has just been awarded to Runkle & Smith, of New York, for furnishing Havana with a pure and abundant supply of spring water. Up to the present time the inhabitants of the Cuban metropolis have been obliged to depend on wells and local springs for water—a condition of affairs that no doubt has contributed largely to the prevalence of fevers and other weakening diseases that have often attacked the residents of the "foreign colony." Some years ago the city authorities, appreciating the necessity of bettering the water supply, took steps in that direction. In the District of Vento, about 8 miles from the southern limits of Havana, there are about 40 springs, all in a space of 60 feet square, capable of furnishing an abundant supply of absolutely pure water. These springs were inclosed with elaborate walls of masonry, and the water was conducted for about seven miles through an aqueduct built in the most substantial manner. The expense, however, was so great that the appropriation for the water works was exhausted before the aqueduct had reached the city line. Extensive litigation arose, and the work came to a standstill. The present contract that has been awarded to Runkle & Smith, in open competition with English, French and Belgian syndicates of contractors, provides for the erection of a reservoir to have a capacity of 15 millions of gallons, the completion of the aqueduct and the distribution of water to all districts of the city of Havana. All the skilled labor will be taken from this country, and it is quite likely that most of the distributing mains will come from America, as Mr. Runkle, of the successful firm of bidders, is also President of the Warren Foundry, of Phillipsburg, N. J. His partner, Mr. R. A. C. Smith, is Treasurer and Manager of the Company in control of the gas and electric light supply of Havana, and his intimate knowledge of the pavements, climatic conditions and municipal regulations of that city will be of immense value in carrying out the details of the contract. The bid of the contractors—which was also the lowest one submitted in the competition—calls for an expenditure of $1,951,691.52, and as one of the conditions of the award was that 10 per cent. of the gross amount of the bid should be deposited in cash by the parties who received the contract, it goes without saying Messrs. Runkle and Smith have ample financial backing. Payments on the contract are to be made and are guaranteed by the Spanish Bank, one of the richest institutions of Spain.

TIMOTHY MCCARTY, a lineman in the employ of the Narragansett Lighting Company, Providence, R. I., was instantly killed by an electric shock received while repairing a defective carbon in a lamp on the corner of South Main and College streets, that city.

Safer Wires.

The *Western Fireman* says that the most pressing need which urges itself upon the inventive genius of to-day, is an insulation of high tension service electric wires that shall confine the current to the limits of the conduit provided. The call is for insulation that will insulate. There are plenty of high-priced, fancy-named, gold-medalled non-conductors now on the market, and the coroners' verdicts and mortuary statistics amply attest their propensity for carnage. The best insulation in the market, under certain circumstances, will permit an untamed current to send human souls into the great hereafter by wholesale. For the prevention of this widespread slaughter, for the removal of this impatience of protection, and the conquering of this omnipotent source of destruction, the call is loud and long. It is a question of life, and must soon be solved.

There is a remarkable democracy about the fatality of the electric wire; the scientific savant and the ignorant and lowly beggar meet upon a common plane in its invincible embrace. It marks no distinctions of race, condition, circumstances or fortune, but takes human life without let or hindrance.

There was a time when statistics placed electric casualties so low in the list of accidental sources of danger as to make them practically an inconsiderable factor. But, it must be remembered that a certain percentage of natural causes of violent injury and death, cannot be controlled by human agency; it must be kept in mind that it is possible to remove entirely the danger to life and limb from electrical installations.

We cannot curtail the power of nature, but it is our duty to protect man from the works of man. Every lineman whose life goes out in the coils of the electric wire, is a charge upon the debit side of the account of humanity with science. It is the business of science to bridle the forces it turns loose on society, and society has a right to demand the requisite protection.

Nor is the demand overdifficult of enforcement. The electrical forces of this country to-day are in the hands, practically, of three great corporations. Their centralization makes them easy of access. The local company is but the feeder of the parent body, and through it the fountain head may easily be reached. Let the mandate go forth that no wire shall swing in any street until it has around it an insulation that can be demonstrated to be safe, and the needed insulation will be forthcoming. The electric companies to day are vast accretions of centralized wealth, and if their business depends upon adequate insulation, the material will be found if money and research can find it, and if it is not to be found it will be the first thing at which electrical science has halted. The councils of cities, small and large, should take concerted and decisive action on this vital question, and compel either safety or abandonment. Protect human life at any cost.

The Market for Gas Securities.

The market for city gas shares showed but little animation during the week, but prices were fairly well maintained. Consolidated is at 93 to 93¼, while Mutual was bid for at a point higher than that last reported. Brooklyn shares show no change.

The event of the week, however, was a ruling handed down in the case of the People, *ex rel.* Peabody *vs.* The Chicago Gas Trust, by Judge Magruder, of the Supreme Court of Illinois. Contrary to general expectation the ruling was decidedly adverse to the Trust, which is declared to be an illegal organization. The Judge holds that "the power to purchase and hold stock in other companies must be the subject of legislation. The general Incorporation Act not only does not expressly authorize the purchase of such stock, but implicitly forbids it in cases where the main purpose of the corporate creation is other than the purchase and sale of stocks."

While this decision will undoubtedly occasion much trouble to the management of the Trust, we make no doubt that a reorganization perfectly within the pale of the law will speedily be effected. The range of the stock at time of writing (noon, Friday) was: Wednesday, A.M., 53¾; Friday, noon, 42. At auction: 315 Consolidated gas (city) at 92⅝–¾; $5,000 Consolidated debenture 5's at 106¾.

Friday, 2:30 P.M.—N. Y. Consolidated has declared a dividend of 2½ per cent. At this hour the stock is selling at 91½–¾, the cause of the decline being a rumor on the street that large blocks of the stock, held by insurance companies, will have to be sold on account of the Boston fire.

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For plant in the Southwest. Must be thoroughly competent to operate gas and electric light plant, thoroughly familiar with the work of construction of both gas and electric light properties, and thoroughly able to discharge all of the duties of a practical gas and electric light Foreman or Superintendent. Parties unable to furnish first-class credentials need not apply. Address, stating salary expected.

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As Superintendent of Gas Works,

Or Assistant in a large works, by a young man who can give good references. Has had some experience in electric lighting. Will go anywhere in the United States. Address

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A Complete Water Gas Plant.

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Economical and Effective.

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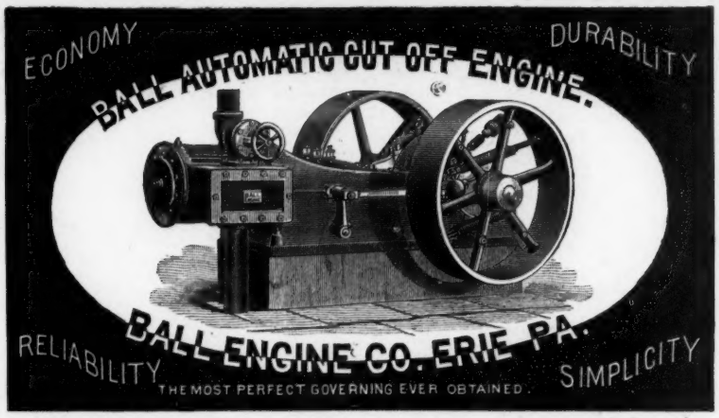

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OF

Incandescent Gas Lighting.

OFFICE, DREXEL BUILDING, PHILA., PA.

At a Meeting of the Gas Trustees of the City of Findlay, held August 28th, it was "Resolved, That we recommend the general adoption of the Welsbach Light, owing to its excellence and economy in the use of gas."

Gasholder Tanks & Gas Works Masonry Complete.

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C. & W. WALKER'S PAT. PURIFYING MACHINE.

TAKING ALL THE WORK FROM THE OUTLET OF THE CONDENSER TO THE INLET OF THE PURIFIERS.

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These Four Machines Purify 12 Millions per Day, and only occupy a Ground Space of 60 ft. by 12 ft., and are 23 ft. 6 in. High.

Four of these powerful Machines for the new extensions at the Beckton Gas Works, London, are now working, purifying Twelve Million Cubic Feet of Gas per day, each Machine taking Three Millions per day.

These Machines can be seen at Beckton, where, after being long and abundantly tried, tested, and proved in every variety of working, have been accepted by the Gas Light and Coke Company, of London, as superior to all other apparatus for taking all the work of the purification of gas between the Condensers and the Purifiers

The Machine is the most important improvement effected in gas works for years past. The purifying power developed is most remarkable. We send an Engineer with a working model to any Gas Company inviting information. It is equally adapted to gas works of any size.

DESCRIPTION.

The gas enters into the washing chamber at the lowermost part, where it is first subjected to a thorough washing in the strong Ammoniacal Liquor. The washing is most effective. The entire surface of the Ammoniacal Liquor is in a bubbling state of ebullition, presenting an agitated, frothy surface all over. All the Tar left in the gas after surface condensation is here completely extracted, and a large amount of Carbonic Acid.

The gas, thus so far purified, ascends from the washing chamber and passes from one superposed chamber to another in contact with the enormous amount of movable, constantly dipping wetted surfaces, leaving the uppermost chamber entirely purified from Ammonia, meeting the chemical requirements of the Board of Trade.

The Machine is self-cleansing, and can never choke or stop up; and in this important respect it is superior to all Machines heretofore known. The space occupied by the Machine is very small. In most cases it can be placed in the space inside the end of the Purifying House. Its cost is less than any other known apparatus for purifying gas from Tar and Ammonia.

These Machines are at work and in hand for Widnes, Burnley, and Oswaldtwistle, in Lancashire; at Harrogate and Wakefield, in Yorkshire; at Stalybridge, in Cheshire; at Stone, in Staffordshire; also at Cheltenham and Northampton; also at Melbourne, in Australia.

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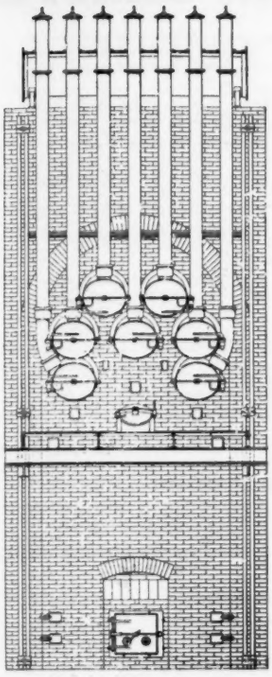

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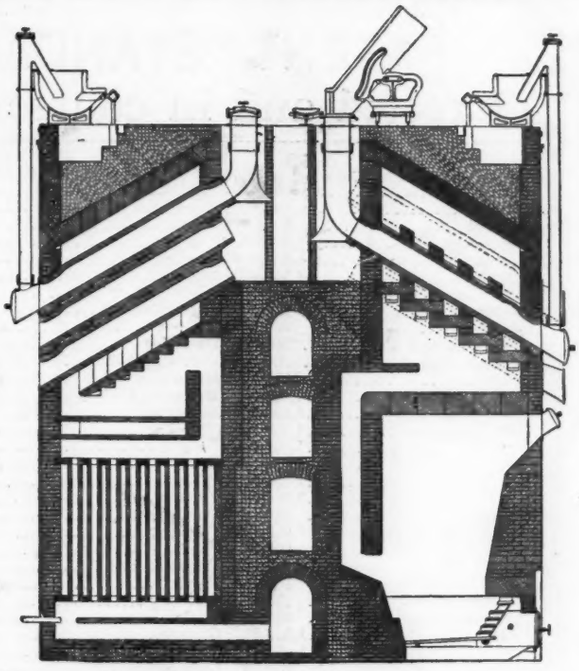
IT IS THE COMING BENCH FOR MAKING COAL GAS.

It will Save from 50 to 60 per ct. in Labor.



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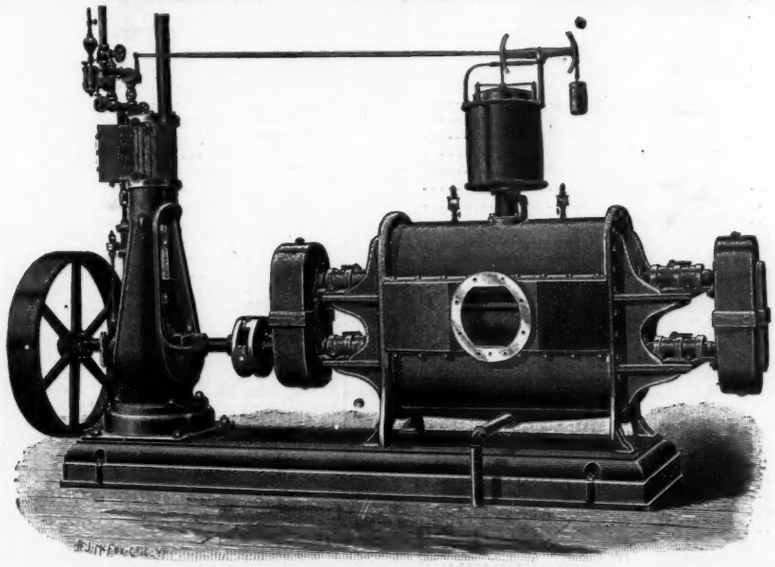

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The Parts Needing Attention are External and Easily Accessible.

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Erected and in course of construction at present date:

	Capacity. Cubic feet per day.
Altrincham	600,000
Adelaide	600,000
Aldershot	200,000
Allegheny, U. S. A.	1,000,000
Ashton-under-Lyne	1,250,000
Amsterdam	1,500,000
"	1,500,000
Annaberg	200,000
Arcachon	100,000
Animal Charcoal Co	200,000
Altoona, U.S.A.	350,000
Buxton	250,000
Bradford	1,000,000
"	1,250,000
"	1,250,000
"	1,250,000
"	1,000,000
"	1,000,000
"	3,000,000
Bremen	150,000
Baltimore, U.S.A.	1,000,000
"	1,000,000
"	1,000,000
Balmain, N.S.W	125,000
Bishops Stortford	150,000
Blackpool	400,000
Brussels	1,250,000
"	1,250,000
"	750,000
"	1,250,000
Banbury	250,000
Birmingham	5,000,000
Birkenhead	2,500,000
Blackburn	1,500,000
Bochum	600,000
Burntisland	250,000
Boston, U.S.A.	2,000,000
Brisbane	1,500,000
"	300,000
Burton-on-Trent	1,500,000
Barcelona	350,000
Barking	100,000
Baerlien & Co	20,000
"	20,000
Bombay	400,000
Buffalo, U.S.A., Mutual	750,000
" **Citizen**	500,000
Brookline, U.S.A	500,000
Bergen	350,000
Berlin	1,250,000
Bournemouth	1,000,000
Bridgeport, U.S.A	500,000
Brunswick	300,000
Beck & Co., St. Louis	100,000
Barmen Rittershausen	600,000
Bexhill	125,000
Brooklyn, U.S.A	1,000,000
"	1,000,000
" **Nassau**	1,000,000
Brunner, Mond & Co	400,000
Cheltenham	2,000,000
Cannes	200,000
Croydon	1,500,000
Copenhagen	200,000
Clevedon	200,000
Columbus, U.S.A	500,000
Cincinnati, "	1,500,000
" "	1,500,000
Chicago "	3,000,000
" "	1,000,000
" "	1,000,000
Chemnitz	1,000,000
Crewe	1,250,000
Colonial Gas Works Co	100,000
Cadiz	300,000
Charlottenburg	600,000
Dudley	750,000
Driffield	100,000
Dukenfield	500,000
Dover	750,000
"	1,000,000
Deal	200,000
Derby	1,500,000

	Capacity. Cubic feet per day.
Dublin	3,000,000
Dowlais	100,000
Douai	500,000
Denton	500,000
Derby, U.S.A	350,000
Denver, "	500,000
" "	1,000,000
Dusseldorf	750,000
"	500,000
Dumfries	250,000
Dunedin, N.Z	400,000
Darlington	1,250,000
Detroit, U.S.A	750,000
Edinburgh	1,500,000
"	2,000,000
Enfield	300,000
Essen	300,000
Elbing	150,000
Falmouth	150,000
Frankfort	300,000
Farnworth	400,000
Fenton	400,000
Friedenshutte	500,000
Furth	400,000
Freiburg	200,000
Goole	250,000
Glossop	300,000
Guildford	300,000
Gloucester	1,250,000
Gera	300,000
Grafton, N.S.W	100,000
Grieg	300,000
Georgetown, U.S.A	250,000
Gluckauf	200,000
Heywood	600,000
Holywood	125,000
Huy	70,000
Harrow	250,000
Harrogate	250,000
Halstead	150,000
Heilbronn	200,000
Havana, Cuba	750,000
Hastings	1,500,000
Huddersfield	300,000
"	750,000
"	1,500,000
Hof	200,000
Hampton Wick	500,000
Heckmondwicke	500,000
Haverfordwest	100,000
Halifax, N.S	350,000
Hamm	200,000
Halle	400,000
Heidelberg	300,000
Hartford, U.S.A	1,000,000
Ilkeston	300,000
Inverness	250,000
Ilkley	200,000
Ilford	100,000
Kingston-on-Hull	400,000
Kidderminster	750,000
Kidsgrove	100,000
Konigberg	1,000,000
King's Lynn	300,000

LONDON:—

The Gaslight and Coke Co.:	
Beckton	1,250,000
"	1,250,000
"	1,250,000
"	1,250,000
"	1,250,000
"	1,250,000
"	2,500,000
"	2,500,000
Silvertown	1,000,000
Bromley	2,000,000
"	1,500,000
"	1,500,000
"	1,500,000
"	2,000,000
"	1,500,000

LONDON—*Continued.*	Capacity. Cubic feet per day.
Shoreditch	2,500,000
Pancras	1,500,000
"	1,500,000
Pimlico	2,000,000
Nine Elms	3,000,000
"	3,000,000
South Metropolitan Co:—	
Greenwich	3,000,000
Woolwich	400,000
Vauxhall	3,000,000
"	3,000,000
Lea Bridge	300,000
West Ham	1,500,000
Leeds	2,000,000
"	3,000,000
"	3,000,000
"	3,000,000
"	3,000,000
"	2,000,000
Leominster	150,000
Leiden	560,000
"	600,000
Liverpool	2,000,000
"	2,000,000
"	2,000,000
"	2,000,000
"	2,000,000
"	3,000,000
Lincoln	1,000,000
"	600,000
Lowell, U. S. A	1,000,000
Louisville "	1,500,000
Long Eaton	500,000
Lilie	900,000
"	450,000
"	750,000
"	250,000
"	250,000
Luckenwalde	330,000
Liegwitz	300,000
Lincoln, U. S. A	250,000
Lawrence "	500,000
Lynn "	300,000
Lyons	1,500,000
Maidstone	1,000,000
Marseilles	1,500,000
"	1,500,000
Mons	500,000
Malines	250,000
Melbourne	1,500,000
"	1,500,000
"	1,500,000
"	1,500,000
"	1,500,000
Manchester	2,500,000
Middleton	400,000
Manley, N. S. W	100,000
Minneapolis, U. S. A	750,000
Magdeburg	300,000
Memphis, U. S. A	750,000
Nottingham	1,250,000
"	2,500,000
"	2,500,000
"	2,000,000
"	1,500,000
"	2,000,000
Newport, U.S.A	430,000
Newmarket	150,000
Newark, U.S.A	680,000
Northfleet	200,000
New York, U.S.A	2,000,000
Nice	600,000
Newcastle, N. S. W	200,000
Numea, "	100,000
Namur	250,000
Newark	350,000
Oldbury	500,000
Otley	200,000
Oswestry	250,000

	Capacity. Cubic feet per day.
Ober Schlesian	1,500,000
Otto & Co.'s Coke Works	1,500,000
Plymouth	2,000,000
Parramatta, N. S. W	100,000
Prescott	150,000
Providence, U.S.A	750,000
"	750,000
Plauen	300,000
"	300,000
Portsmouth	2,500,000
"	2,500,000
Pittsburgh, U.S.A	1,500,000
Portland, "	560,000
Pawtucket, "	500,000
Quebec	250,000
Radcliffe	750,000
Rouen	250,000
Ramsgate	1,000,000
Reigate	200,000
Richmond, U.S.A	250,000
Roxbury, "	500,000
Runcorn Soap Co	20,000
Rockhampton, N. S. W	125,000
Richmond	1,500,000
Reading	2,000,000
Reichenbach	200,000
Salford	1,750,000
"	1,750,000
"	1,750,000
Smethwick	750,000
Sydney, N. S. W	1,000,000
"	1,000,000
"	2,500,000
"	50,000
"	50,000
Sunderland	1,500,000
St. Josephs, U.S.A	250,000
Spa	100,000
Sevenoaks	300,000
St. Petersburg	2,000,000
"	1,500,000
St. Louis, U.S.A	2,000,000
"	2,000,000
"	1,000,000
Laclede	1,000,000
Silesian Coal Co	600,000
San Francisco, U.S.A	2,000,000
"	2,000,000
Sheepbridge Coal Co	40,000
Stettin	200,000
Singapore	300,000
Sutton	500,000
Tonbridge	150,000
Tipton	400,000
Tottenham	1,000,000
Toledo, U.S.A	750,000
Toronto	1,000,000
Uxbridge	300,000
Valparaiso	500,000
West Bromwich	1,000,000
Willenhall	250,000
Weston-super-Mare	500,000
Waltham	150,000
Wormwood Scrubs	300,000
Williamsburg, U.S.A	600,000
"	600,000
Wellington	150,000
Warwick	300,000
Wheeling, U.S.A	500,000
Walker	300,000
Westgate	100,000
Wilmington, U.S.A	500,000
Windsor, N. S. W	100,000
Wolverton	100,000
Wellington, N. Z	250,000
Whitchurch	175,000
Washington, U.S.A	2,000,000
Wallasey	750,000
Weimar	150,000
Wurzen	200,000
Worcester, U.S.A	750,000
Yeadon	500,000
Yeovil	250,000

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OF

Fuel and Illuminating Water Gas Works.

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Illinois Light, Heat & Power Co.	Chicago, Ill	Bellevue Water and Fuel Gas Light Co.	Bellevue, Campbell County, Ky.
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Niles Gas Light Co.	Niles, Mich.	San Diego Gas Fuel & Electric Lt. Co.	San Diego, Cal.
Newton Illuminating Co.	Newton, Kansas.	Sioux Falls Gas Co.	Sioux Falls, Dak.
Wellington Light & Heat Co.	Wellington, Kansas.	Dakota Gas and Fuel Co.	Grand Forks, Dak.
Chippewa Falls Gas Lt. Co.	Chippewa Falls, Wis.	St. Johns Mutual Gas Co.	St. Johns, Mich.
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Madison City Gas Light Co.	Madison, Wis.	St. Paul Gas Light Co	St. Paul, Minn.
South Bend Gas Light Co.	South Bend, Ind.	Emporia Electric and Gas Light Co.	Emporia, Kas.
Sheboygan National Gas Co.	Sheboygan, Wis.	Van Wert Gas Light Co.	Van Wert, Ohio.
Salina Gas Light Co.	Salina, Kansas.	Lansing Gas Light Co.	Lansing, Mich.
The Rathbun Co	Deseronto, Prov. Ont.	San Francisco Gas Lt. Co.	San Francisco, Cal.
Jefferson City Gas Lt. Co	Jefferson City, Mo.	Shelbyville Gas Light Co.	Shelbyville, Ind.
Mankato Gas Light Co.	Mankato, Minn.	Great Falls Gas Light Co.	Great Falls, N. H.
Lima Gas Light Co.	Lima, Ohio.	Belleville Gas Co.	Belleville, Ontario
		Rochester Lt. and Fuel Co.	Rochester, Minn.
		Northwestern Gas Light and Coke Co.	Evanston, Ill.
		Lincoln Gas Light Co.	Lincoln, Neb.
		Davenport Gas Light Co	Davenport, Iowa.
		Municipal Gas Co.	Albany, N. Y.
		Alliance Gas Light Co.	Alliance, Ohio.
		New Gas Light Co.	Janesville, Wis.
		*Chicago Gas Light & Coke Co.	Chicago, Ill.
		*Joliet Gas Co.	Joliet, Ills.
		*Superior Light & Fuel Co.	Superior, Wis.
		*Kewanee Gas Light Co.	Kewanee, Ill.
		*Standard Gas Light Co.	New York City.

*Building.

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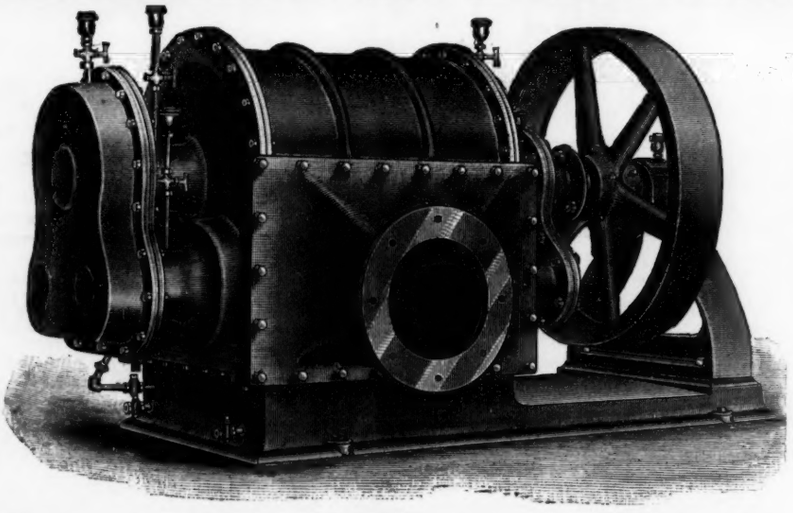

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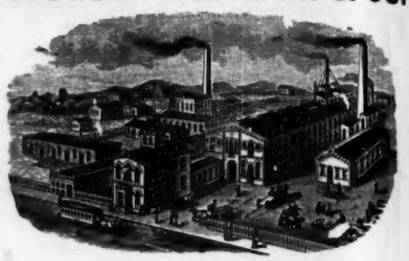

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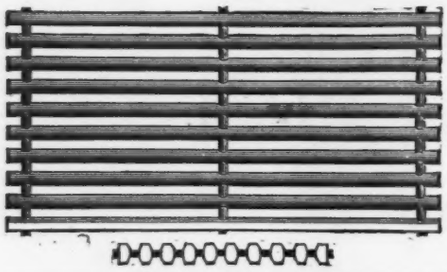

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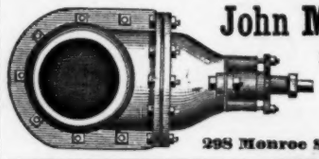

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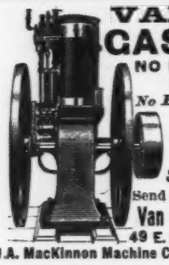

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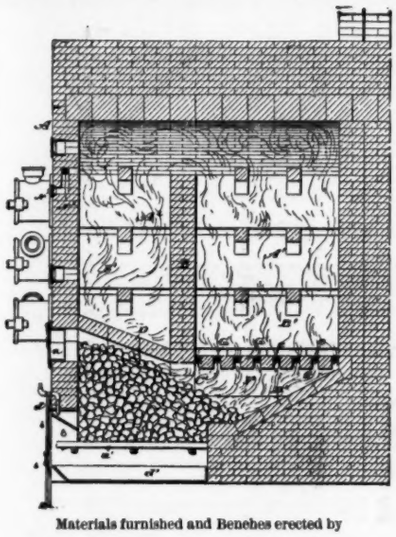

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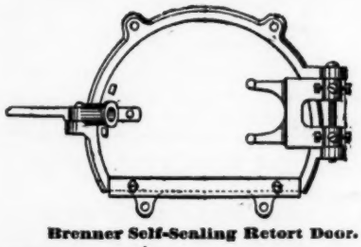

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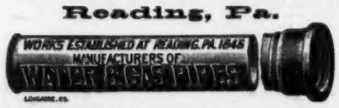

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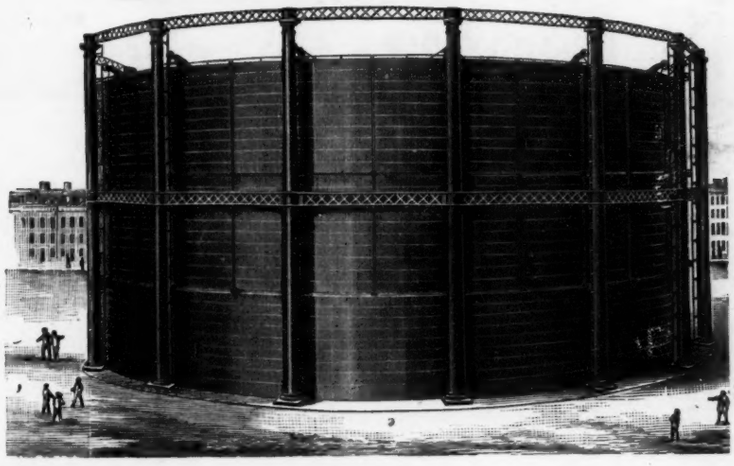

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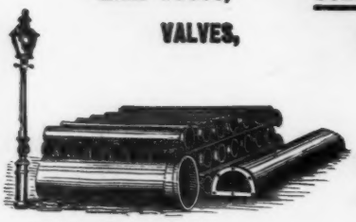

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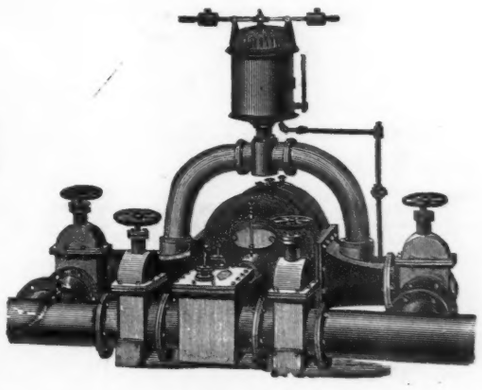
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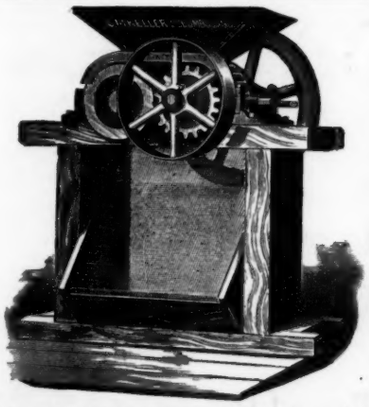

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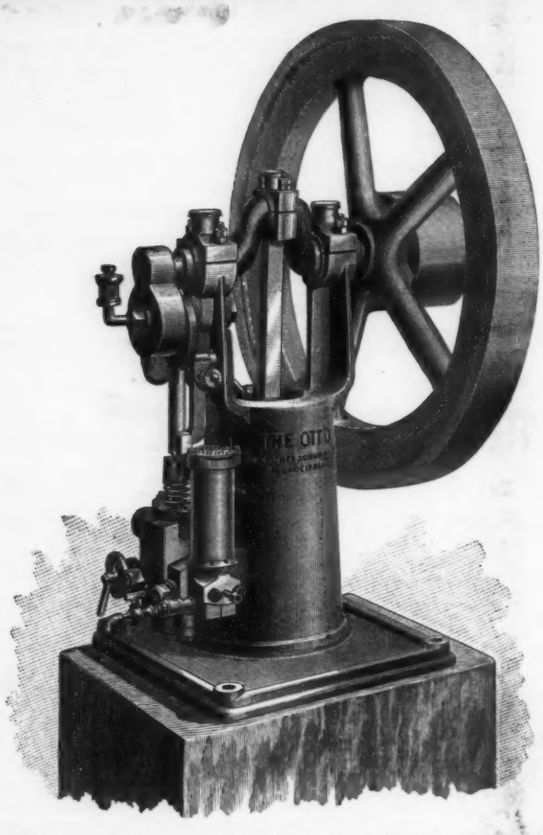

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